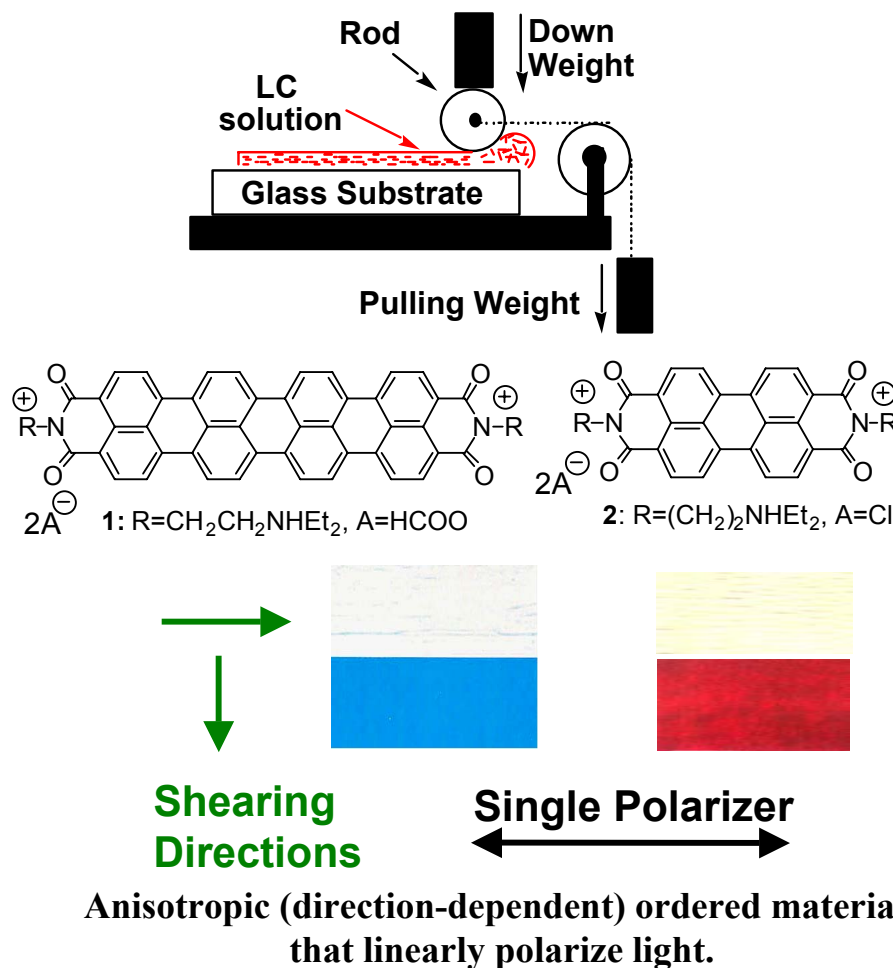


Controlling Molecular Assembly and Optical Properties of Organic Thin Films by Rational Design

Suk-Wah Tam-Chang, University of Nevada, Reno, DMR-9876027

Research Goals:

1. To investigate the structural factors influencing the self-organization of organic compounds into lyotropic, chromonic LC phases.
2. To control the molecular orientation of organic compounds in the solid state and to fabricate anisotropic (direction-dependent) ordered solid films that linearly polarize light by shear-induced orientation of chromonic liquid crystal crystals on substrates.



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Education:

A special topics course on “Supramolecular Assemblies: Applications in Organic Materials and Sensors” was developed. This course introduced to students concepts in materials chemistry and the corresponding state-of-the-art instrumentation and techniques used in the field.

This integrated teaching and research program prepares students for careers that may include organic materials research in industry and improving their access to a teaching career in science.

This project provided education and research training to 4 undergraduates (including 2 female students) and 7 graduate students (including 3 females and a Native American).

Broader impacts:

Many useful materials and devices that we take for granted today depend on the self-organizing properties of organic compounds into a liquid-crystalline phase in the manufacturing process or in the functioning of the device (e.g, liquid crystal display). A further understanding of the structure-property relationship of liquid-crystalline compounds is important for designing novel liquid-crystalline materials, optimizing properties, and developing new applications.